

CLAIM AMENDMENTS

Please cancel Claim 4, without prejudice or disclaimer of subject matter, and please amend Claims 1, 2, and 5-8, as indicated below. The following is a complete listing of claims and replaces all prior versions and listings of claims in the present application:

Claim 1 (currently amended): A photoelectric conversion device comprising:

a plurality of pixels arranged in a pixel region, each pixel including a photoelectric conversion region for converting light into a signal charge, and a peripheral circuit arranged outside of ~~[[said]]~~ the pixel region and including a circuit for processing ~~[[said]]~~ the signal charge, the plurality of pixels and the peripheral circuit being disposed together on a substrate, wherein the photoelectric conversion region includes:

a first semiconductor region of a first conductivity type disposed in the substrate of a second conductivity type that is opposite to the first conductivity type;

a second semiconductor region of ~~[[a]]~~ the second conductivity type ~~that is opposite to said first conductivity type, and that is, the second semiconductor region being disposed in the first semiconductor region~~ substrate for accumulating ~~[[said]]~~ the signal charge; and

a transistor for transferring the signal charge from the second semiconductor region,

wherein the peripheral circuit includes a third semiconductor region of the first conductivity type and comprising said peripheral circuit, disposed in the substrate,

wherein ~~[[the]]~~ an impurity concentration of ~~[[said]]~~ the first semiconductor region is higher than ~~[[the]]~~ an impurity concentration of ~~[[said]]~~ the third semiconductor region, and wherein the first semiconductor region extends deeper into the substrate than the third semiconductor region.

Claim 2 (currently amended): A photoelectric conversion device comprising:

a plurality of pixels arranged in a pixel region, each pixel including a photoelectric conversion region for converting light into a signal charge, and

a peripheral circuit arranged outside of ~~[[said]]~~ the pixel region and including a circuit for processing ~~[[said]]~~ the signal charge,

wherein the plurality of pixels and the peripheral circuit ~~[[being]]~~ are disposed together on a substrate,

wherein the photoelectric conversion region includes:

a first semiconductor region of a first conductivity type disposed in the substrate,
the substrate being of a second conductivity type that is opposite to the first conductivity type;

a second semiconductor region of ~~[[a]]~~ the second conductivity type ~~that is~~
~~opposite to the first conductivity type, and that is,~~ the second semiconductor region being
disposed in the first semiconductor region substrate for accumulating ~~[[said]]~~ the signal charge;
and

a transistor for transferring the signal charge from the second semiconductor region.

wherein the peripheral circuit includes a third semiconductor region of the first conductivity type and comprising said peripheral circuit, disposed in the substrate,

wherein said first and third semiconductor regions have impurity concentration profiles forming peaks; ~~and,~~

wherein ~~[[the]] a peak impurity concentration of [[said]] the first semiconductor region is higher than [[the]] a peak impurity concentration of [[said]] the third semiconductor region, and~~

wherein the peak impurity concentration position of the first semiconductor region is disposed deeper than the peak impurity concentration of the third semiconductor region.

Claims 3 and 4 (cancelled).

Claim 5 (currently amended): The photoelectric conversion device according to Claim 2, wherein ~~[[said]]~~

the first semiconductor region has a structure wherein plural semiconductor regions having have impurity concentration peaks disposed in a depth direction inside [[said]] the substrate, and [[the]]

an impurity concentration of [[the]] an impurity concentration peak disposed in [[the]] a deepest portion is higher than [[the]] an impurity concentration of [[the]] an impurity concentration peak disposed at [[said]] a side of the photoelectric conversion device [[side]].

Claim 6 (currently amended): The photoelectric conversion device according to Claim 2,

wherein ~~[[said]]~~ the first semiconductor region and the third semiconductor region are formed ~~[[by]]~~ of plural semiconductor regions having ~~[[the]]~~ impurity concentration peaks, and ~~[[the]]~~ a peak impurity concentration of ~~[[the]]~~ a region of ~~[[the]]~~ a highest impurity concentration peak, among plural regions of ~~[[said]]~~ the first semiconductor region, is higher than ~~[[the]]~~ a peak impurity concentration of ~~[[the]]~~ a region of ~~[[the]]~~ a highest impurity concentration peak concentration among plural regions of ~~[[said]]~~ the third semiconductor region.

Claim 7 (currently amended): A photoelectric conversion device comprising:

a plurality of pixels arranged in a pixel region, each pixel including a photoelectric conversion region for converting light into a signal charge, and

a peripheral circuit arranged outside of ~~[[a]]~~ the pixel region, ~~[[and]]~~ the peripheral circuit including a circuit for processing ~~[[said]]~~ the signal charge,

wherein the pixels and the peripheral circuit ~~[[being]]~~ are disposed together on a substrate,

wherein the photoelectric conversion region includes:

a first semiconductor region of a first conductivity type disposed in the substrate,
the substrate being of a second conductivity type that is opposite to the first conductivity type;

a second semiconductor region of ~~[[a]]~~ the second conductivity type ~~opposite to~~
~~said first conductivity type, and, the second semiconductor region~~ being disposed in the first
~~semiconductor region~~ substrate for accumulating ~~[[said]]~~ the signal charge; and

a transistor for transferring the signal charge from the second semiconductor

region,

wherein the peripheral circuit includes:

a third semiconductor region of the first conductivity type ~~and comprising said peripheral circuit;~~ disposed in the substrate,

wherein ~~[[said]]~~ the first semiconductor region has a structure wherein plural semiconductor regions having impurity concentration peaks are disposed in a depth direction inside ~~[[said]]~~ the substrate, ~~[[the]]~~

wherein an impurity concentration of ~~[[the]]~~ an impurity concentration peak disposed in ~~[[the]]~~ a deepest portion is higher than ~~[[the]]~~ an impurity concentration of ~~[[the]]~~ an impurity concentration peak disposed at ~~[[said]]~~ a side of the photoelectric conversion device ~~[[side]]~~, and ~~[[the]]~~

wherein an impurity concentration of ~~[[said]]~~ an impurity concentration peak disposed in ~~[[the]]~~ a deepest portion of ~~[[said]]~~ the first semiconductor region is higher than ~~[[the]]~~ an impurity concentration of ~~[[said]]~~ an impurity concentration peak of ~~[[said]]~~ the third semiconductor region.

Claim 8 (currently amended): The photoelectric conversion device according to Claim 7, wherein ~~[[said]]~~ the impurity concentration peak disposed in the deepest portion of ~~[[said]]~~ the first semiconductor region is deeper than an impurity concentration peak of ~~[[said]]~~ the third semiconductor region.